commodore

INTERFACE

MAY 1981
$2.50

LEGAL TIME
ACCOUNTING

COMMODORE ANNOUNCES LEGAL AID FOR LAW FIRMS.

commodore
CBM
computer
commodore
Tractor Printer
4022
commodore
CBM
dual drive
floppy disk

Why should any law firm be sentenced to long hours of paperwork? With a Commodore computer, you can spend all of your time doing what you do best: law.

Come in for a trial demonstration of our CBM computer and here's just some of what you'll witness. You'll see a computer that can store thousands of pieces of information about all of your clients. What you're doing for them and how much they owe you. You'll see how our computer can print out customized statements, billing analyses and more. Fact is, our computer can do just about anything a law firm needs except practice law.

So if you're part of a law firm that can use some legal aid in your paperwork department, do yourself justice and try a Commodore CBM computer. It's that simple. We rest our case.

commodore

The Commodore Interface (formerly the *Commodore Newsletter* of the PET users club) provides a vehicle for sharing current information, ideas, programming techniques, hardware interfacing, and cost effective applications relating to the Commodore PET/CBM/VIC computers, between owners, users and the manufacturer.

The Newsletter contains new product news, details on current software, time saving tips on programming, product literature reviews, suggestions for educational uses and other information of interest to Commodore computer users.

Members are encouraged to submit articles for publication in the Newsletter.

The Commodore Interface is published 6 times a year by Commodore Business Machines, Inc. The subscription fee is $15.00 for 6 issues within the United States and its possessions and $25.00 for Canada and Mexico.

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Application Form

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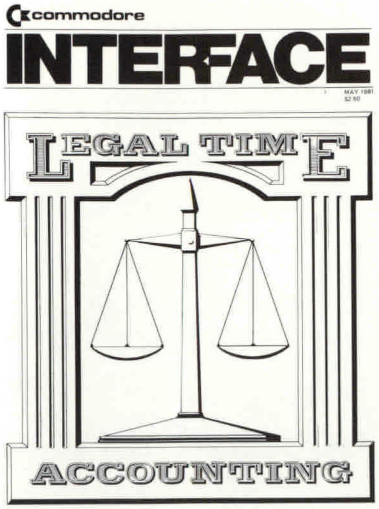

commodore
INTERFACE

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Q&A HOTLINE

1.0 vs 2.0 DOS

Q. I have recently purchased the new DOS 2.0 for my 2040 floppy drive. Although I can still read my old disks I can't seem to write on them. Is there anything I can do?

A. Mills, Philadelphia, Pa.

A. *When a 2040 is upgraded to 2.0 DOS the following applies.*

1. *If you have programs on a disk that was formatted with 1.0 DOS you can read it, but you can not write on this disk with 2.0 DOS. You must format a blank diskette with the 2.0 DOS and then copy your 1.0 program to the formatted disk. With the new disk you can now read and write.*
2. *If you should try to write on a 2.0 formatted disk with a 1.0 DOS floppy, you will be unable to read the directory on that disk.*
3. *The way to tell how a disk was formatted is to call up the directory and the last digit on the reverse field will determine what DOS was used to format that disk. A "1" means DOS 1.0 and a "2A" means it was 2.0 DOS. If you cannot read the directory it is likely that your disk is not formatted properly for your drive.*

Q. We use Commodore machines in processing group health insurance claims. Each claim processed required creation of up to four separate disk files. Each file uses less than 1 block on the 2040 system. In theory, we should be able to have 600 plus files per diskette. However, the limitation of 152 directory entries prevents full utilization of disk capacity. Is there some way to "fool" the 2040 into accepting storage of more than 151 separate files?

P. F. Lowell, Jr., Carolina Consulting Services, Inc.

A. *No, not without altering the hardware inside your 2040. However, in cases similar to yours it is possible to write data directly onto a diskette using the BLOCK-WRITE command, and to read this data back to computer memory using the Block-Read Command. Thus, directory entries are not needed and the 152 file limitations is avoided.*

Letters

- We have just received the COMMODORE SOFTWARE ENCYCLOPEDIA and are more than impressed. We are ecstatic!
- As a lot, we who are PET/CBM owners are fiercely loyal to the machine. Economic considerations require us to present our software on a variety of machines, but of the machines our company sells software for, the PET is the favorite!
- Even though it was not required of the vendors, please accept our check to cover your expenses for mailing us your first edition. We truely appreciate being listed.

Sincerely Yours,
Harry H. Briley, Consultant in Data Processing

COMMODORE NEWS

Commodore welcomes the following new dealers:

HOWELL'S TYPEWRITER
Winter Park, FL

SELECTRIC SERVICES, INC.
Miami, FL

EAGLE COMPUTER SYSTEM
Orangestand, Aruba.N.A.

WISSOTA
Chippewa Falls, WI

ELECTRONIC ALTER., INC.
Indianapolis, IN

A.I.D.
Minn., MN

UNIFIED BROKERS
Independence, MO

BELL ELECTRONICS
Fairview, PA

CENTURY COMPUTER SYST.
La Habra, CA

AUSTIN LOGIC RES. INC.
Austin, TX

MIDWEST COMPUTERS
Manhattan, KS

INTEGRAL BIOMEDICAL ENG.
Sacramento, CA

COMPUTER FARE INC.
Oberlin, KS

DOLAN JONES
Missoula, MT

COMPUTER PLACE
Kalispell, MT

PROFESSIONAL BUS. SYST.
St. Helena, CA

RAY MORGAN CO.
Chicko, CA

COMMODORE COMPUTER CTR.
Menlo Park, CA

OMNIFAX COMPUTER STORE
Phila., PA

OMNIFAX COMPUTER STORE
Wilmington, DE

PROGRAMS UNLIMITED
Jericho, NY

RESOURCES TRADING CO
Buffalo, NY

DWAYNE INDUSTRIES
Pleasant Hill, CA

INFOMAX
Walnut Creek, CA

KENTUCKY MICRO
Lexington, KY

SOUTHERN MICRO COMPUTER
Miami, FL

RESOURCE CONTROLS, INC.
Lansing, MI

T.C.C.S.
Sioux Falls, SD

NATIONAL MICRO
Muskegon, MI

SCOTT INFO. MGNT. SYST.
Copley, OH

COMPUTERLAND/BOSTON
Wellesley, MA

WHIZ COMPUTERS
Los Angeles, CA

DEAN COMPUTER INC.
Fort Smith, AK

COMPUTERS LIMITED
Midland, TX

COMMODORE COMPUTER CENT.
San Rafel, CA

PLAZA HOBBYCRAFT
Hermitage, PA

DALLAS TECH. INFO. SYST.
Dallas TX

E. G. SYSTEMS
Anchorage, AK

ACE-TECH
Bandon, OR

3–E SOFTWARE & SYSTEMS
Hayward, CA

COMMODORE COMPUTER CENTER
Mel Pitas, CA

J.F.M. & ASSOC.
Bethel, AK

MAINES DATA SERVICES
Clearfield, PA

OMNIFAX COMPUTER STORE
Cherry Hill, NJ

LEX-TRONICS
Basking Ridge

OMEGA SALES CO
Cumberland, RI

OMNIFAX COMPUTER STORE
Feasterville, PA

MATRIX ELECTRONICS
Yaphank, L.I., NY

COMPUTER DESIGN GROUP
Coral Springs, FL

TALTANS SELECT BUS. EQ.
Duram, NC

COMPTRONICS
Lebanon, IN

COMPUTER JUNCTION
Cedar Falls, IA

SCHAFERS
Boyne, MI

COMPUTER CORNER
Lyndhurst, OH

COMPUSYSTEMS
Martinsville, NJ

COMPUTER DATA SYSTEMS
Reno, NV

PROFESSIONAL COMP. ASS.
Austin, TX

MICRO AGE COMP. STORE
El Paso, TX

MARATHON BUSINESS SYST.
Reading, PA

Digital Music Redefined

The alarm startled the audience. The singer has just finished her song. Out in the audience during the lull between songs a watch alarm began chiming. Fleur-de-lis, the tune playing on the watch, is a distinctive tune. To call this melody an alarm is probably to use too harsh a word. Probably better known as the theme from the movie **The Godfather**, this melody distinctly identifies the watch as one manufactured by Commodore.

For a moment the alarm startled the singer. Her eyes darted towards the sound and the individual groping in her sleeve to still the watch. The musician picked up her guitar. Together watch and musician finished the song in unison. The duo received a standing ovation. ■

Commodore Technical Hotline

Commodore Computer Systems Division has initiated a toll-free Hotline that has been operating since April 6, 1981. The number is 1-800-523-5622.

The hotline handles questions dealing with technical support, software and hardware of the Commodore Business Machines product line.

The hotline is manned by Commodore personnel from 8:30 a.m. to 5:30 p.m. Eastern Standard Time, Monday through Friday.■

COMMODORE NEWS

The following information has been taken from the Dow Jones News Service Data Base.

Commodore Cash Register Co. Establishing New Dealer Network

". . .Commodore has set up a Dallas-based subsidiary, Commodore Cash Register Co., and is organizing a separate U.S. Dealer Network for cash registers. Production of the cash register (with the retail price starting at $2,495) is scheduled to start in June."

–February 18

Commodore International Sees 4th Quarter as best in Company History

Norristown, PA – Commodore International Ltd. expects results for its fourth quarter ending June 30 to be 'the very best in Commodore's history' said Irving Gould, Chairman, in a prepared statement.

Gould said sales and earnings for the current quarter would be 'well ahead' of both last year's final quarter and the third quarter reported earlier today.

In the 1980 fourth quarter the company earned $6,935,000 or 65 cents a share including a $750,000 extraordinary credit. This reflects a 3-for-1 stock split paid last November. For the latest quarter Commodore International had $6,825,000 or 66 cents a share in net income.

Commodore International logged $35,599,000 in sales in the 1980 fourth quarter and $50,215,000 in the 1981 third quarter.

–April 22

Yes Virginia, Commodore Does Make Thermostats

Commodore's new microprocessor controlled thermostat can keep you comfortable while it saves you money.

The energy used in heating and cooling your house, apartment, or small business is energy wasted when you are not there. Adjusting your thermostat a few degrees at night or during the day when no one is home is one of the most effective ways possible of saving energy and money in today's energy-hungry world. The thermostat sold by Commodore's Consumer Products Group features large, continuous readout of both time and temperature and sliding levers for controlling the temperature during both day and night. It can store and automatically execute up to four temperature changes each day. They can be programmed to automatically control your home's heating and cooling system each day for a whole week.

The Commodore thermostat can be installed by a novice do-it-yourselfer using only a screwdriver. You simply remove your old thermostat and replace it with the new unit, using existing wiring and working right at the wall. It is an exact wire-for-wire replacement for conventional thermostats.

With it's sliding switches you can easily control your home's heating and cooling system each day for the whole week. There are no complicated digital keyboards or dials. Simply slide the levers to select the desired times and temperatures to fit your household schedule. If you will be away all day a simple flick of a switch will tell the system to stay in the night set-back setting for that day.

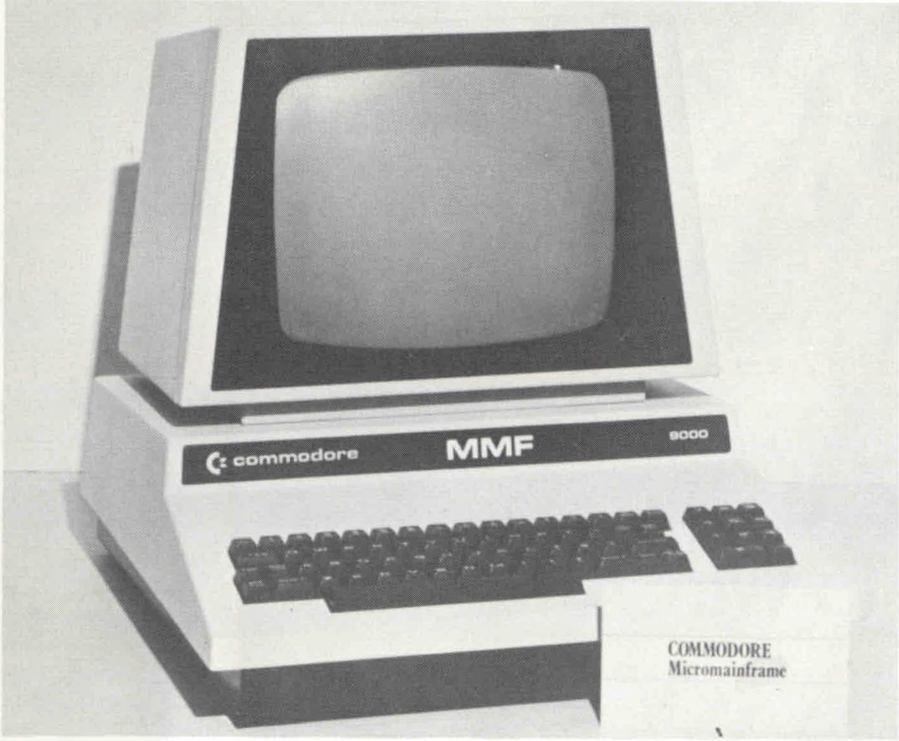
Purchase of the thermostat qualifies you for a 15% tax credit under the National Energy Act. Counting energy savings and tax credits the unit can pay for itself within one year. There are three models, one for heating, one for cooling, and one to control both heating and air conditioning. Each retails for $150.00. To order yours, or for further information contact the Commodore Consumer Products Group at 1-800-523-0522 (in Pennsylvania (215) 666-5978). ■

ON FAN AUTO
COOL OFF HEAT
10:27 68°
NIGHT
SMTWTFS
commodore
DAY TEMP
NIGHT TEMP
TIME OF CHANGE

New Commodore Micro Electronic Thermostat features sliding lever controls for time and temperature settings. Compact size is just 1 3/4" x 3 1/2" x 5 1/8".

COMMODORE NEWS

Micro-Mainframe



Micro-\'mi-(,)kro\adj [micr]: very small; esp: microscopic.
Mainframe – \'man,fram\n: a powerful computer containing relatively advanced capabilities.

Commodore's Micro-Mainframe, the newest product addition to the Commodore family, was developed out of a need for a computer with mainframe features at a micro price.

Software has been developed by Waterloo Computing Systems Limited to meet the requirements of the University of Waterloo (Waterloo, Ontario) and hardware developed by BMB, also located in Canada.

- Based on the highly successful CBM 8032 computer, all software written for the 8032 will run on the Micro Mainframe.
- 134K bytes memory storage including 96K RAM bank-switched memory and 36K ROM,
- the ability to accept any one of five mainframe-like computer languages, including: Waterloo microBASIC, Waterloo microAPL, Waterloo microFORTRAN, Waterloo microPascal, Waterloo 6809 Assembler Language and linker, with COBOL under development by Waterloo Computing Systems Limited.
- high-speed telecommunications, including RS232-C interface and terminal emulation capabilities.

In addition, the Commodore Micro-Mainframe incorporates both 6502 and 6809 microprocessors and an intelligent operating system providing complete software and peripheral equipment compatibility.

Software

An extensive Software package for the Micro-Mainframe has been developed by Waterloo Computing Systems Limited. This portable software is particularly suited to microcomputers, but identical versions are available on many medium and large scale systems. Consequently, a user is not limited by the capacity of the micro; the identical program will run on the most advanced equipment available without necessitating modification. Reference manuals, textbooks, and instructor's guides are available for each software component of the system.

Hardware

In terms of other hardware requirements, the Micro-Mainframe is compatible with any CBM disk drive (2040, 4040, 8050) and any CBM printer (2022, 4022). The particular application in question will determine exactly which CBM product to use.

Applications

The Micro-Mainframe can be applied successfully in several types of environments including:

- A business environment as a stand-alone system, using the wide variety of business software packages written for the 6502 based CBM 8032 computer, or the 6809 processor.
- An educational environment for training in languages and system design.
- A traditional mainframe environment as a mainframe system development tool, with the available languages and up-load/off-load capabilities.

The Micro-Mainframe, which will be on display at the National Computer Conference in Chicago (May 4-7), is scheduled for delivery to dealers in late 1981. ■

EDUCATION

Playing to Win: Antonia Stone

By Joseph Devlin

The young people with whom Antonia Stone works have never been ideal students. Most of them – ex-offenders and residents of New York's juvenile detention facilities – have poor reading and writing skills and have experienced little but failure and frustration at school. By employing microcomputers and specially-designed and educationally oriented computer games, Ms. Stone is able to involve individuals who otherwise would have little interest in education.

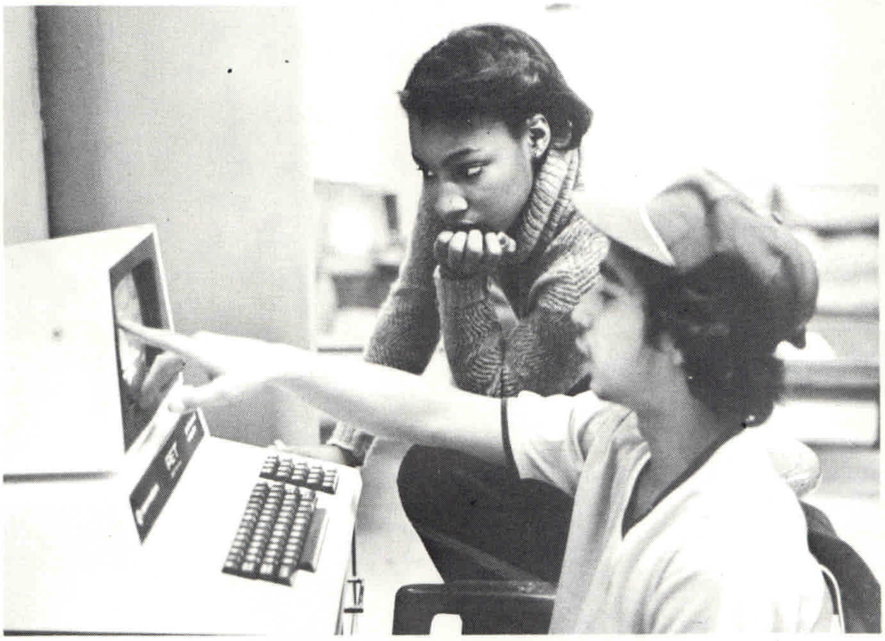
Antonia Stone began to develop her program, "Playing To Win", in 1979 and early 1980 while she was chairman of the mathematics department at the Columbia Grammar and Preparatory School. In March 1980, Ms. Stone introduced Playing To Win to the Fortune Society, a non-residential counselling service in New York City serving ex-offenders and young people in trouble with the law. It was in the Fortune Society setting that the materials and methods used by Playing To Win were developed and tested.

The program started in May, 1980, with the purchase of three 8K PETs. These machines were placed in a lounge/study area which services primarily the juvenile (16-21 years old) division, but are available for use by all Fortune members from 9:30 a.m. to 5 p.m. and later when volunteers are able to supervise them.

The program has three purposes: first, to provide motivation for learning and incentives for developing educational goals; second, to provide drill and practice correlated with the existing education program at Fortune; and third, to provide an avenue through which Fortune members can become computer-literate, begin studying programming, and experience a stimulus towards a possible career. While no formal evaluation has yet been undertaken, it is clear that working with computers has increased the rate at which participants learn. Many Fortune members have indicated an interest in learning BASIC and have started studying programming. Others have learned to operate the machines and to edit the programs for the teachers.

The software of Playing To Win is all in game format. The games are designed to appeal to teenagers and adults, and every game reinforces in some way a basic math, verbal or problem solving skill. Games can involve students in acquiring skills they would not otherwise pursue. A participant who has no conscious interest in learning math skills may nevertheless strain to answer math problems correctly in order to win a computerized version of Tic-Tac-Toe or in order to better an opponent's score on Beat The Clock. Since the average reading level of a Fortune member is somewhere between 3rd and 4th grade, the games must be easy to understand with minimal directions. They are designed whenever possible for one or more players and offer a variety of difficulty levels.

Playing To Win's catalog of programs includes games based on such sports as bowling, baseball, and darts. Points are scored when a player gives a correct answer to a language skills or math problem. Other well-known games such as Hangman and Concentration have been programmed. Concentration, in which a player must solve problems and remember their locations in order to 'match' them with their solutions, is a particularly versatile game. It can easily be edited to provide drill in a large variety of subjects by matching, for example, cities with states, titles with authors, homonyms, synonyms, or basic math facts.



These and other games in Playing To Win's repetoire allow the user to test and improve his/her skills while learning to plan strategy and retain information. Some PTW programs also develop eye-hand coordination. One such game requires a player to open or close switches for moving trains on a railroad track layout by typing the switch's letter designation as the train approaches. The player must respond quickly or the train crashes. Of course, at the same time, the user, is gaining familiarity with the typewriter keyboard. ➔

Games that meet all the desired criteria have been difficult to come by. There has been little money in the budget with which to purchase software. Many of the programs have been donated by generous PET users. More software is appreciated! At the moment, neither Playing To Win nor Fortune can pay for the programs. Fortune will, however, provide income tax credits for anyone who contributes usable material.

One indication of the success of PTW is the fact that the program is expanding. In the spring of 1981, Ms. Stone acquired funding to bring Playing To Win to the Spofford Juvenile Center, a secure detention facility located in New York City, currently housing 192 delinquents and juvenile offenders awaiting sentencing. Playing To Win at Spofford will be a joint project of the Fortune Society and the Juvenile Justice Department of the City of New York. Ms. Stone's staff will include some people whose first introduction to computers was through PTW at Fortune. The Spofford project is expected to involve 24 new PET computers purchased by the City of New York.

Questions about Playing To Win can be addressed to Antonia Stone, Director; Playing To Win, Inc.; 106 East 85 Street; New York, New York 10028. Ms. Stone is particularly interested in information about other programs involving the use of computers in prisons or correctional facilities of any kind. ■

The Commodore Interface
is seeking features for
use in upcoming issues.
If you have developed
a program, game or
an application that
would be of interest
to our readers
please submit this to:

EDITOR
Commodore Interface
681 Moore Rd.
King of Prussia, PA 19406

Park Avenue's True Success Story

by Jody Miller

Victor B. told me he likes it when he sees the word "CORRECT" flash across the PET's screen in front of him. He likes it so much, in fact, that he spends several hours a day on the computer at the Fortune Society, 229 Park Ave. S., Manhattan, NY., one of their several PETs. It all started with MAXIT, he said, which is an introductory computer game used to familiarize the students at Fortune with computers. "Gradually", he told me, "I worked up to playing Hangman and Concentration and now I am writing my own game programs. . .you know, it's called Victor's Game and it's not too hard. It's a pretty good math game. . ."

Nineteen year old Victor knows more about New York City street life than most hardened criminals. A truant throughout his entire junior year of high school, he finally dropped out at the age of 17, because, he asserts, "The work was boring and I already knew it. It wasn't worthwhile. . .I couldn't make any money from it." So he hung out. For two years. Until his arrest in September, 1980 on burglary charges. And until he spent two months in a New York City prison. Upon his release on bail, Victor heard about the tutoring programs held at the Fortune Society, a tutoring and counseling center for ex-offenders. He started attending the sessions in November, and is currently employed as a Counselor-in-Training there, receiving a paycheck regularly.

Soon Fortune hopes to be organizing a similar computer tutoring program in a New York City prison. Only ten of the 82 juvenile students (age 16-21) at Fortune will be selected to assist in this project, and Victor hopes to be one of them. But even if he's not, he says, he's taking his high school equivalency test next month. The math, spelling, and reading computer programs are helping him to sharpen his skills in those areas. And he's trying to learn enough about computers at Fortune to become qualified for a position as a computer technician.

At the age of 19, Victor has his whole life ahead of him. He's going places; he has plans. But more than that, his successes at Fortune have helped to develop within him some sense of self-respect, some confidence, some pride in his achievements.

No, the Fortune Society does not claim to be a panacea for society's vast myriad of ills, nor does it claim to be the solution to New York City's increasingly worsening crime situation. But for Victor and 81 of his colleagues there, the Fortune Society offers the opportunity for each participant to achieve some degree of success. And that, by far, is Park Avenue's true success story. ■

```
READY.

 50 REM**VICTOR B'S PROGRAM**
 60 REM**WRITTEN DURING PROGRAMMING INSTRUCTION AT THE FORTUNE SOCIETY**
 70 REM**229 PARK AVENUE SOUTH, NEW YORK, N.Y. 10003**
 80 REM**THIS PROGRAM IS NOT COMPLETE**
 90 PRINT"";
 100 INPUT"TYPE FIRST NUMBER";F
 190 PRINT"";
 200 INPUT"TYPE SECOND NUMBER";T
 290 PRINT"";
 300 INPUT"TYPE THIRD NUMBER";W
 350 IF W>=FTHENPRINT"SORRY,I FORGOT TO TELL YOU..."
 355 IF W>=FTHENPRINT"THIS NUMBER MUST BE LESS THAN YOUR FIRST NUMBER."
 360 IF W>=FTHENGOTO300
 400 LETH=F*T+W
 490 PRINT"";
 500 PRINTF;"X";T;"+";W;"=";H
 550 PRINT"NOW I'LL  SHOW YOU A DIVISION PROBLEM."
 560 PRINT"USE THE MULTIPLICATION PROBLEM TO HELP"
 570 PRINT"YOU GET THE ANSWER."
 600 PRINT"";H;"/";F;"=";
 610 INPUTA
 620 INPUT"REMAINDER";R
 700 IF A=T AND R=W THEN GOTO 800
 750 PRINT"INCORRECT. TRY AGAIN."
 760 GOTO600
 800 PRINT"VERY GOOD!WANT ANOTHER TRY (Y/N)";
 810 INPUTA$
 820 IFLEFT$(A$,1)="Y"THENGOTO90
 830 PRINT"THANKS FOR PLAYING!!"
 840 END
READY.
```

JINSAM

OFFICIALLY APPROVED BY COMMODORE

DATA MANAGER

SAVE TIME. SAVE MONEY. Let JINSAM work for you.

- ★ CUSTOM DATA FILES
- ★ CUSTOM REPORTS/LABELS
- ★ KEYED RANDOM ACCESS
- ★ FAST/EASY/MENU DRIVEN
- ★ MULTIPLE SEARCH KEYS
- ★ PRIVACY ACCESS CODES
- ★ WILD CARD SEARCH

"JINSAM is the best Database Management System for the Commodore Computers!"

JINSAM data manager assists you by intellectually manipulating records.

No more will hundreds of valuable hours be spent searching for needed information. No more will hundreds of hours be spent entering and re-entering information for various reports.

With JINSAM you can truly transform your Commodore Computer into the "state of the art" data processing machine with sophisticated features and accessories found nowhere, even at 10 times the price.

There are three disk based JINSAM. JINSAM 1.0 allows fast and easy file handling, manipulation and report generation. JINSAM 4.0 was designed for the professional and contains features needed in the business environment, such as: JINSORT, a user accessible machine language sort; compaction/expansion of databases, merging databases and much much more. JINSAM 8.0 is our best. JINSAM 8.0 runs on the new Commodore 8032, 80 column display computer. JINSAM 8.0 has all the functions of 4.0 plus additional features found only on the most sophisticated and expensive database management systems.

JINSAM is a new breed of data processing software. Powerful, sophisticated and easy to use. JINSAM has been thoroughly field tested. JINSAM is now installed and saving its users valuable time and money in educational institutions, research institutions and offices nationwide.

JINSAM was designed with the user in mind. It is a forgiving system with help commands, prompts and utilities for recovering the bulk of data even after power failure, security passwords for privacy, editing, reclaiming space, auto recall, restructuring, unlimited report formats, label printing and a choice of accessory modules all accomplished by a few keystrokes.

JINSAM has 5 accessory interfacing modules:

WORDPROPACK – Intelligent interface for WORDPRO 3 or WORDPRO 4 which creates variable block with data or up to 10 conditions based on database contents. Produce "dunning letters", form letters, report to parent, checks, invoices, etc.

MULTI-LABEL – Prints multiple labels per record with up to 2 lines for messages and consecutive numbering. Produce inventory, bulk mail labels, etc.

MATHPACK – global +, -, x, ÷, by another field or a constant, or zero a field. Sum fields in each record or running sum of single field in all records. Extract information or effect permanent change. Replace in same field or place in a waiting field.

DESCRIPTIVE STATPACK – Determine mean, median, mode, standard deviation, variance, range. Generate histogram and produces Z-Score report.

ADVANCED STATPACK – (you must also acquire DESCRIPTIVE STATPACK). Generates CROSSTABS (number of occurances); CHI SQUARE, LINEAR REGRESSION with graphic representation and prediction. LINEAR CORRELATION and SIMPLE ANALYSIS OF VARIANCE.

All JINSAM accessories are accessed thru the JINSAM menu and require a security password to gain entrance.

JINSAM gives the user **FREEDOM OF CHOICE.** Start with JINSAM 1.0 and upgrade at any time. Choose from the accessory modules available at any time. JINSAM Newsletter brings the latest updates, user input and keeps an eye on the future.

JINSAM alone is reason enough to own a computer. JINSAM can be found at Commodore dealers. Write for the dealer nearest you.

CALCPACK – Two way interface for VISICALC will be available as of June 1, 1981.

The many features of JINSAM 1.0 – 8.0

JINSAM 1.0 for 16K/32K CBM 2001. Requires CBM 2040 or COMPU/THINK disk — including oldest ROMs. Menu Driven, ISAM – Indexed Sequential access method ● Encripted PASSWORDS for privacy ● Unlimited fields ● unlimited search criteria ● 3 deep subsorts ● .5 – 3 sec retrevial ● editing ● Auto Recall ● Wild Card Capabilities; Reports: multiple headings ● paging ● page numbering ● item count. Labels: any size ● 1-5 across ● sheet or continuous. Utilities: Help commands ● Recover ● Key Dump ● Record Dump ● Descriptor Dump ● Restructure.

JINSAM 4.0 for 32K CBM 2001 with BASIC 4.0. Requires CBM 2040 with DOS 2.1. Has most of JINSAM 1.0 functions Plus + machine sort with user access instructions ● sort 1000 records in apx 10 secs ● Global Compaction/Expantion ● Create new database from existing database ● merge databases. Includes MULTI-LABEL ● 3 deep subsorts.

JINSAM 8.0 for Model 8032 with 80 Column screen. Requires 2040 or 8050 disk. Commercial Disk version for 80 Columns, JINSAM 4.0 functions Plus + Displays report formats to screen, 3 deep subsorts.

JINSAM is a trademark of JINI MICRO-SYSTEMS, Inc.
WordPro is a trademark of Professional Software, Inc.
VISICALC is a trademark of Personal Software, Inc.

FLASH: We have broken the 255-byte limit! Now you can have **unlimited** record lengths included with JINSAM 4.0 and 8.0!

JINSAM Data Manager
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BUSINESS NEWS

Maintaining a Mailing List with OZZ

by Patty Hesser

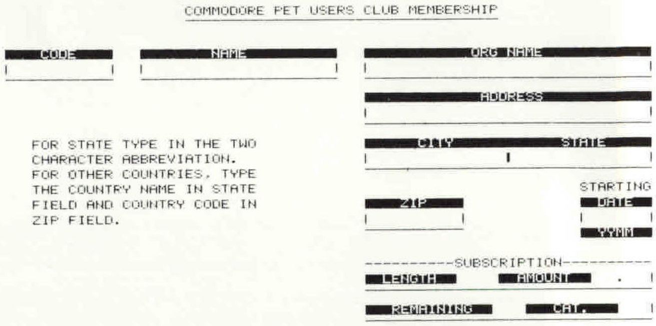
In the last issue of the **COMMODORE INTERFACE**, we introduced you to OZZ. OZZ is the new information management program made available by Commodore which runs on the 8032, one or two 8050 dual disk drives, and an ASCII or Commodore printer. OZZ is an intelligent information retrieval system that can be adapted to many applications. We suggested many possible uses for OZZ, including Inventory Control, Medical Recordkeeping, Accounting, Cost Analysis, Materials Control, Invoicing, and Mailing Lists.

A mailing list is something which is used by nearly every type of business. A prime example of a mailing list application is the subscriber list for the **COMMODORE INTERFACE**.

When I was hired in October, I had never even seen a computer before. I was given a complete system, an OZZ program, manual, and a list of 2,500 names and addresses, as well as about 1000 envelopes containing subscription forms and checks. From this confusing mound of paperwork, I created an organized and functional set of records and printed mailing labels, invoices, and a complete list of subscribers. Using the OZZ system, anyone can organize great amounts of information like this easily, with no prior computer experience.

The first step in OZZing is to decide what information you need to store. For the **COMMODORE INTERFACE** subscriber list we needed to know the name, address, city, state and zip code of each subscriber as well as their specific subscription information: date we received their subscription, how many issues they wanted, the amount paid and how many issues they have yet to receive.

Next, you enter OZZ's file format editor and draw a form with labels and boxes which will contain the information you'll be using. I really enjoyed designing the forms and it was very simple with the help of the manual. A couple of little twists must be pointed out here. Your first text box is known as your "key field" box. This should be something unique to each record because this is how you'll be looking them up after they're entered. Once your format is finished and stored, it cannot be changed, so make sure it is correct and contains all the information you need before storing. OZZ will accept up to ten different file formats on each set of data disks. The file format for the **COMMODORE INTERFACE** looks like this:



COMMODORE PET USERS CLUB MEMBERSHIP

CODE

NAME

ORG NAME

ADDRESS

FOR STATE TYPE IN THE TWO CHARACTER ABBREVIATION. FOR OTHER COUNTRIES, TYPE THE COUNTRY NAME IN STATE FIELD AND COUNTRY CODE IN ZIP FIELD.

CITY

STATE

ZIP

STARTING DATE

YYMM

-----------SUBSCRIPTION-----------

LENGTH

AMOUNT

REMAINING

CAT.

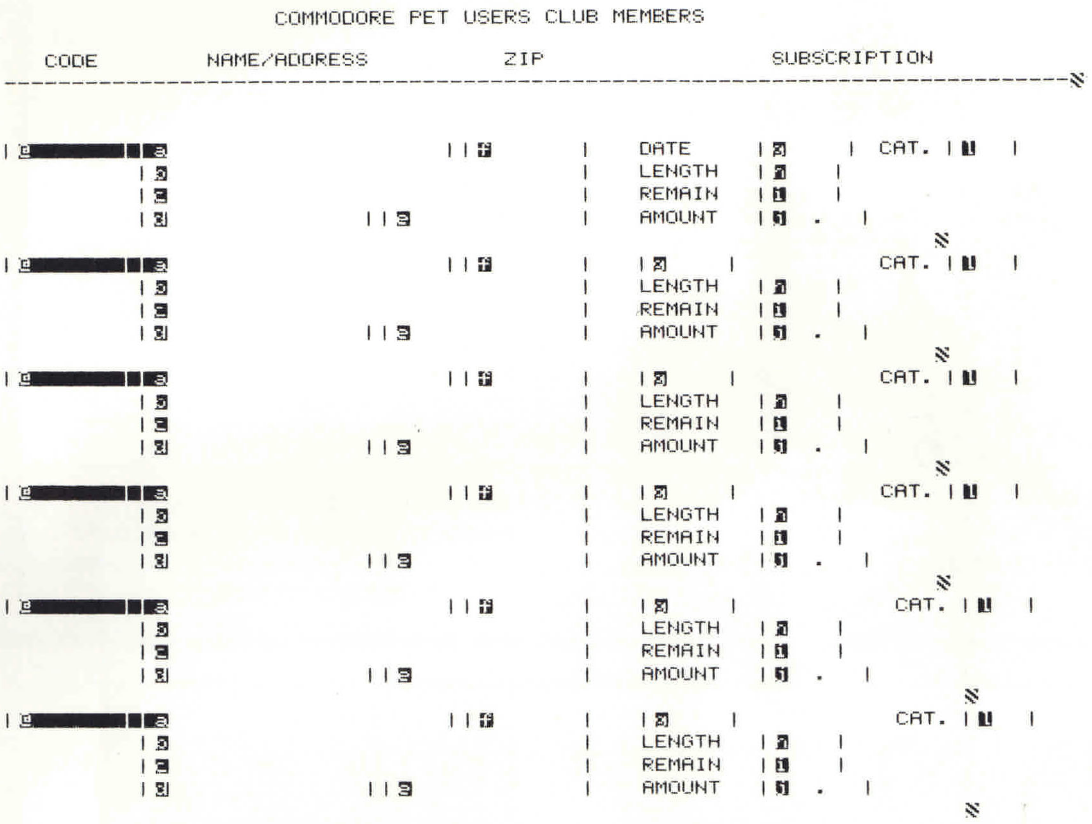
Then you enter your data. This is very simple and your only limitation is how quickly you can type. The "return" or "cursor" keys move you from box to box within each record, and two-letter commands enable you to insert new records, call up ones already entered, and make changes or deletions. You can call up records you've already typed in either by its key field name or by the number OZZ assigns it, consecutively as you type records in. You can also do searches, asking OZZ to look through all existing data for a certain string of characters. The number of records you can store depends on the number of files you have open, the size of each record and the number of disks you use.

The subscriber list for the **COMMODORE INTERFACE** entailed entering over 3,600 names, addresses, etc. This does take a certain amount of time and persistence, but once all the records are entered, it is only a matter of adding new records and amending old ones as subscription forms, renewals, and address changes that come in.

Now you have all your records conveniently located on two floppy disks, you can lock up the old file cabinet with the reams of paperwork you'd previously been using and concentrate on how you can use the information you have stored. For the **COMMODORE INTERFACE**, there were two things which needed to be printed out. One was a complete subscriber list with all the information stored on the four disks. This was for finding information quickly when the computer was not available or OZZ was not loaded. The second necessary printout was the actual mailing labels.

Setting up printouts is much the same as setting up your file format. You enter the "document editor", draw the layout of the document on the screen, and tell OZZ where you want information from your records to be printed out. The printout format for the **COMMODORE INTERFACE** subscriber list looks like this on the screen:

When actually printed data will be filled in where there are reverse field letters.



```
                    COMMODORE PET USERS CLUB MEMBERS

    CODE          NAME/ADDRESS          ZIP                 SUBSCRIPTION
--------------------------------------------------------------------------


|                              | |      |   DATE     |     |  CAT. |    |
               |                        |   LENGTH   |   |
               |                        |   REMAIN   |   |
               |           | |          |   AMOUNT   |  .  |

|                              | |      |   |    |          CAT. |    |
               |                        |   LENGTH   |   |
               |                        |   REMAIN   |   |
               |           | |          |   AMOUNT   |  .  |

|                              | |      |   |    |          CAT. |    |
               |                        |   LENGTH   |   |
               |                        |   REMAIN   |   |
               |           | |          |   AMOUNT   |  .  |

|                              | |      |   |    |          CAT. |    |
               |                        |   LENGTH   |   |
               |                        |   REMAIN   |   |
               |           | |          |   AMOUNT   |  .  |

|                              | |      |   |    |          CAT. |    |
               |                        |   LENGTH   |   |
               |                        |   REMAIN   |   |
               |           | |          |   AMOUNT   |  .  |

|                              | |      |   |    |          CAT. |    |
               |                        |   LENGTH   |   |
               |                        |   REMAIN   |   |
               |           | |          |   AMOUNT   |  .  |
```

Printing out the actual mailing labels was even simpler. Depending on the type and size of tractor fed labels you are using, set up your print format with the correct number of lines per label and put in break points where OZZ is to go from one label to the next. A couple of printing hints: don't forget to tell OZZ which file format and printout format to use and you must always tell OZZ where the end of the page is. If you forget either of those, it will form feed without printing.

When it actually comes time to print, you have a number of choices as to what information from your files OZZ is to retrieve and print out. You can list your entire data file or start at any particular point either alphabetically or consecutively by record number. You can pick out individual records and print them one at a time. Since we mail the magazine by bulk mail we needed our mailing list broken down by state and zip code. This is made possible by the Set Analysis command.

Set analysis involves using 〉, 〈 or = to tell OZZ which records should be printed. For an example; for a mailing list, depending on how you'd like it sorted, you can tell OZZ to print all records = to NJ (the state of New Jersey) and go on through all fifty states. Or you can do a state and zip code analysis with such information as all records = NY and zip codes 〈 029*, to further break down within the states. Depending on the number of records in a file, time may put a limitation on how far you can break things down when setting analysis. The more records you have, the more OZZ has to search through in order to satisfy the set analysis criteria.

Once you've chosen your set analysis criteria, you pick what record you'd like to start with and print them out consecutively by record number or in alphabetical order.

Not only did I use OZZ for printing out the subscriber list and the labels for the **COMMODORE INTERFACE**, but I also used it to keep a record of the purchase orders which came in and printed out invoices as we mailed out orders.

I found OZZ a fun-to-use yet very professional program. OZZ can handle great amounts of information for you, eliminating time-consuming and tedious paperwork, and creates documents in the form and containing the information you need. The OZZ system, aided by an excellent manual, makes using OZZ a simple matter even for non-computerists. It is a system you design to suit your own individual requirements.■

BUSINESS NEWS

Legal Time Accounting and the Law Firm

by Mike Heck

Your time is worth money. Commodore's new software package will help you manage your business more effectively.

With the rising costs of running a law practice and the payments coming in slower each month, lawyers are facing some difficult decisions concerning the ways they'll be conducting their business in the next few years.

The Legal Time Accounting (LTA) software package, written by Mike Miller of Cimarron Corporation, will free the lawyer from much of the paperwork that is beginning to occupy so much of his time. With a Commodore 8032 computer, 8050 floppy disk drive and a properly interfaced letter quality printer, LTA organizes and automates the business-end of running a law practice, leaving the lawyer free to practice law.

In essence, LTA keeps track of the services the lawyer performs for his clients and handles billing automatically. The LTA system can also be used to see, instantly, who is doing what in the law firm, for which client, and how much of the lawyer's time each client has used. Knowing this can help in planning more effectively, and spotting any weaknesses and potential problems.

Entering the Information

LTA is easy to use, even if you have never seen a computer before. Feeding information into the system, and retrieving it when needed can be done simply and quickly. Clear, step-by-step instructions make it easy to select the desired function and perform it correctly.

The first thing that appears on the screen once the LTA program has been loaded (this involves hitting two keys on the keyboard) is the "Main Menu". After making a selection from this menu the user is automatically guided through the particular task selected. A mask will appear on the screen giving you instructions and blank lines to fill in. For example, if you select #1 from the Main Menu, a Client Data Entry mask will appear. This provides spaces for you to fill in the client's name, address, the name of the lawyer working on the case and type of billing statement desired.

Along the way, LTA prompts you further in plain English to make sure you don't make a mistake. LTA always asks "Are you sure?" before anything is amended, giving you a chance to change your mind.

The Main Menu of LTA lets you choose from 12 major options:

- Client File Maintenance
- Matter File Maintenance
- Log File Maintenance
- Post Log Entries
- Print/Display Clients
- Print/Display Matters
- Client Matter Inquiry
- Statistics Reports
- Print Statements
- Utilities
- Diskette Backup
- Interface Menu

After making a selection from the main menu you are presented with a set of additional options. The Client Data Entry Menu options provided include the opportunity to Add new clients, Change current data, Delete a client or Exit to the main menu. By designing a system in this way, you can always see exactly what you are working on, and the current options available.

Using LTA does not involve any change in the lawyers daily routine. As the lawyer completes an activity (each type of activity can be assigned a pre-determined hourly charge) he merely jots down all the pertinent information on a prenumbered logsheet. At the end of the day, or at any time that is convenient, the LTA files are updated using the information entered on the logsheets during the day. If by chance incorrect information is input, it can be easily changed later on.

What Happens to the Information

The real power of LTA is that not only can you enter all this information very easily, but also what happens to the information once entered into the computer. The LTA system provides you with an amazing ability to sort out and printout information in a useful form. LTA will keep logs of all activity on a client's account, and will store the information on both a client-by-client and a case-by-case basis. All the information in these logs can then be retrieved instantly and the logs updated or changed whenever necessary.

LTA automatically prepares an up-to-date analysis of all aspects of your business allowing more efficient management and decision-making. All activities and their associated costs are tracked, accumulated, analyzed, and reported at varying levels of detail as specified by the user.

Statistical reports let you know exactly what is occuring within the firm. Among the kinds of reports the LTA system provides are summaries of activity by firm, by lawyer, or by both lawyer and firm, as well as aging analysis by firm or by lawyer.

Reports and Billing

LTA does more than act as a filing system. It's also a billing system capable of printing statements that can be tailored to show in a number of different ways how your clients are being charged. Statements can be printed in any of eight different formats, on a client-by-client basis and can be generated as often as desired. Statements can be printed on the firm's own letterhead according to the way you specify.

Statements can range from no statement being sent to a detailed statement being sent for all matters, with complete aging, and may be printed on the firm's own letterhead forms.

No other software package in its price range can compare with LTA in the number of ways it can help your law firm function better.

Who Can Use LTA

The package can be effectively used by a firm of up to 10 lawyers, approximately 500 active clients, 1500 open matters, and 2500 outstanding charges.

The LTA package can be purchased from any authorized Commodore dealer. Retail price of the LTA package is $595.00.■

SELECTIONS FROM THE LTA MENU

Client File Maintenance allows you to add a client to the firm or change client information. Simply filling in a form on the screen with the client's name, address and other necessary information creates a permanent record of this information. In this, and other LTA selections, you have the option of later changing the data. An address could be changed or a new phone number added.

Matter File Maintenance creates a matter (case) record whenever a client is accepted, or a new matter is being handled for the client. This menu selection lets you establish this matter in the system along with a description of the matter. A space for remarks is also provided.

Log File Maintenance lets you enter the specifics about each activity that is performed for a particular matter. If, for example, and hour was spent on correspondence for a client, then a pre-numbered log sheet would be filled out indicating the type of activity, time spent, fee for the activity and any remarks.

The remarks section can be used in printing out statements, giving you an itemized listing of services performed. Log file maintenance would also be used to record payments received.

Post Log Entries automatically matches all open logs with the appropriate matter and client, and up-dates receivable balances. Perhaps the most important function of LTA, this operation coordinates all the information entered to produce timely accurate statements.

Client Matter Inquiry shows exactly what services were performed and how much was billed for the service, including totals for the period and the amount billed-to-date for the matter. With this selection you can view all log entries for a particular matter, with all the associated details for each, such as the Activity Code, Fee Code, the amount billed and the total amount billed-to-date for that matter. Any payments received will also be shown as credited to the account.

Statistical Reports (Aging Analysis) reflects outstanding receivables over a 90-day period. The aging analysis shows current receivables, plus 30, 60, and over 90 days, for each lawyer, the entire firm, or both.

Activity Analysis shows total expenses to date, broken down by activity type, and by the percent of the total represented by each activity.

These reports can be run to show receivables for the entire firm, with totals by an individual lawyer, or by all the lawyers in the firm with each case individually handled. This provides an accurate analysis for the firm of the most frequent or expensive activities performed.

Print/Display Clients provides a listing of clients on a printer or computer display either by individual client, a specified group of clients, or the whole file.

Print/Display Matters provides a listing of all matters by a selected matter, group of matters, or all matters.

Print Statements automatically prints any of eight types of statements as specified during client data entry.

Utilities lets you setup, and later change, Fee Codes, Activity Codes, Lawyer Codes as well as other seldomly changed items such as printer type. Diskette Backup lets the user copy diskettes to guard against damage and loss of data.

Interface Menu provides for linking LTA to other systems and returning to the main menu. Two of the options (available in a future release of LTA) will provide for transfering Client File data to Wordcraft 80 and for a telephone link to the WESTLAW Legal Data Base.■

LTA: A Case History

by Joseph Devlin

Philip Stephen Fuoco runs a successful one-man law practice in Haddonfield, New Jersey. He handles a large number of criminal cases. Neither he nor his wife Carol had ever used a computer prior to the arrival of LTA, but they were beginning to drown in the paperwork that comes with running a modern law office and were looking for a better way. They are finding relief in LTA.

Carol has always helped out with the billing and it was to her that the task of taming this new-fangled technological beast fell. In order to keep track of his business the counselor maintains a legal logbook or diary. Into this book goes all the information about each day's activities; which clients were seen, which called in for advice, how much time was involved, what was discussed, etc. In the past Carol had to sit down several times a week and manually transfer each piece of information from the growing list in the log book to the appropriate client record. This is a tedious and painstaking job that entails pulling a new file folder every time some new information about a client is encountered in the log, entering the information, and then returning the record to its proper spot. Under the old method each case record must again be pulled when billing time comes round. Each bill is then individually tabulated using calculator, pencil and paper. LTA has ended much of the time-consuming drudgery, has streamlined the flow of paper, has automated billing, and is providing statistical information not easily obtained with the old manual system.

It took a few days for Carol to become fully familiar with the computer and the LTA program. She will admit to an initial wariness about using a computer to handle the paperwork in the office. After using the system for only a few hours she has changed her mind. Today she is sold on computers and LTA. In her own words; "LTA has been a tremendous time saver. It does all the work for you."

Philip Fuoco has found that although LTA has streamlined the flow of paperwork in his office it has not changed the way he practices law. It is the business aspect of the law office that LTA is designed to change, not the practice of law itself. He carries on giving his legal advice as before, and records his efforts in his diary the way he always has. What has changed is what happens to the information he writes into his diary. Carol still has to sit down with the diary once in a while. But her days of shuffling papers and pulling files are over. Rather, she turns on the computer, takes a few seconds to load the LTA program into the machine, and to call up the LTA Main Menu. On the screen before her appears the menu of options LTA will allow. Carol selects the option she requires, just as if she were in a restaurant. The computer fills the screen with blank boxes for Carol to type in. Each box is labeled as to what sort of information is required. By filling in the boxes that appear on the screen Carol can enter information about a new client, change the record of an old client, obtain the client's record, or print statements for billing purposes.

Continued on Page 17

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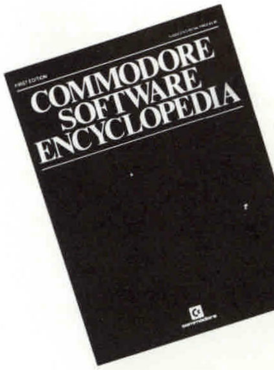

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PROGRAMMER'S TIPS

An Introduction to Basic, Machine Code, and Assembly Language: Part 2

by Emily Berk

This time we will examine the 6502 hardware as it applies to the assembly language programmer, say a few words about the assembling process, do some numeric conversions, and then start to learn some assembly language. As the discussion becomes more technical, you may want to consult some references, such as 6502 Assembly Language Programming by Lance Leventhal (Osborne) or MOS Programming and Hardware Manual (reviewed elsewhere in this issue). I would be happy to answer questions, which can be routed to me care of the editor.

As you now know, an assembly language is intimately related to the microprocessor it controls. Since the whole purpose of the assembly language is to flip switches in the microprocessor, it is important that the programmer know which switches he is flipping and what it is those switches are doing. Figure 1 is a map of a 6502 microprocessor system as filtered through the eyes of an assembly language programmer.

Memory

Memory is an array of bits (switches) in which can be stored both instructions to the 6502 and data. The 6502 can read instructions and data from memory and it can write data into memory. The location of an instruction or a piece of data in memory is know as its address.

NOTE: Bit, short for binary digit, is the term used for any physical or logical entity that can exist in one of only two possible states at any instant. Programmers usually think of bits as being in state 0 or state 1, or, in other words, as equalling either 0 or 1. A group of 8 bits is known as a byte. The 6502 usually examines data in byte-sized chunks. 6502 assembly language instructions can be 1, 2, or 3 bytes long.

Registers

A register is a small set of associated bits that is contained inside the microprocessor. The 6502 has a number of 8-bit internal registers that can be used by the programmer. They are known as the X, Y, and A (accumulator) registers, and the PC and SP registers. (I will discuss the special uses of each of these registers as I go along.) Using registers instead of memory to store data is advantageous because the instructions used to access them are often shorter than other instructions and execute more quickly. Obviously, since there are only a few internal registers, and since they must often be used for special purposes, most programs will still need to use memory storage.

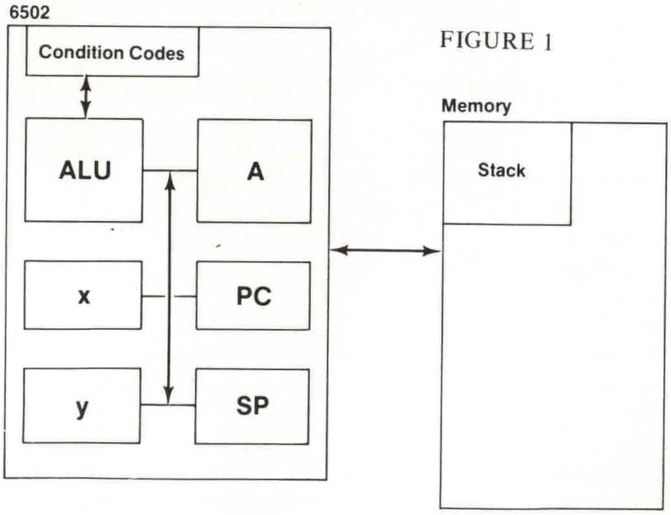


FIGURE 1

The ALU

The ALU, or Arithmetic Logic Unit, is the part of the 6502 which performs its arithmetic and Boolean calculations.

Condition Codes

Operations in the ALU can have other affects. The 6502 Condition Code Register contains 4 bits. They are the N bit, the C bit, the Z bit and the V bit. The N bit is set (i.e., equals one) if the result of an ALU operation was negative. The C bit is set if a carry resulted from an ALU operation. The Z bit is set if a zero resulted form an ALU operation. The V bit is set if an ALU operation overflows. Condition codes allow the program to make gotos (branches) conditional on the results of texts on data in the accumulator.

The Assembly Process

Before I go on, I will say a few words about assemblers. An assembler is a program (or person) which translates the mnemonic assembly language instructions into machine language that can be understood by the computer. Usually, this involves converting each mnemonic into numeric code - either hexadecimal, decimal or binary and storing the assembled machine language program at a known location. There are many machine language programmers who hand-assemble their

→

PROGRAMMER'S TIPS

programs and then enter them using either Basic POKE commands or the monitor feature of their microcomputers. Hand-assembling is a slow, tedious process. Care must be taken to do conversions carefully lest errors be induced. No syntax checking is done before programs are run, and if impossible operations are attempted, it may be as likely that the programmer has mistyped a digit as that his thinking was in error.

I, being lazy, much prefer to use a software assembler. An assembler can perform initial syntax and obvious error-checking that can prevent problems later on. It allows the programmer to think entirely in mnemonics and saves him hexadecimal headaches. An assembler also facilitates program documentation and alteration – especially usefully when one is first learning to use assembly language and when developing new programs. Choosing an assembler is a difficult task. The Commodore Software Encyclopedia lists two: The Assembler Development Package (p. 35) and EARL for the PET (p. 34). Check with your dealer for advice and a demonstration. Meanwhile, in my programming examples, I will try to supply both the assembly listing and the hexadecimal code. Decimal conversions are left to the individual.

Numeric Conversions

By the way, do you know how to do numeric conversions? If not, it's time you learned. Let's start with binary. Binary, or base two, is a number system whose digits can be only one of two possibilities (that's why its binary, obviously). By strange coincidence, those possibilities are 0 and 1. Sometime in grade school most of us learned the concept of positional representation. That is, the number 8 in the rightmost digit of a decimal number means eight (8×10^0), but the number 8 in the place second to the right means eighty (8×10^1). In other words, each place in a decimal number is weighted (i.e., multiplied) by some power of ten. The same is true in binary, but instead of multiplication by powers of ten, we multiply by powers of two. In order to indicate that a number is in a particular number system, we follow it with a subscripted number equal to its base. So $10_{10} = 1 \times 10^1$, but $10_2 = 1 \times 2^1$. Translating from binary to decimal is fairly simple.

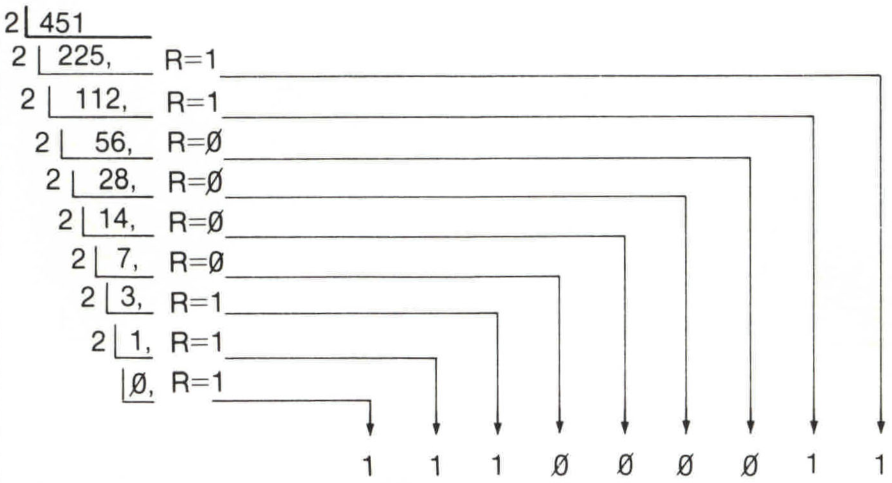
Multiply each binary digit by its positional weight, and then add your products. The multiplications don't get very complicated because you're always multiplying by either a one or a zero. So,

$101100_2 = 0 \times 2^0 + 0 \times 2^1 + 1 \times 2^2 + 1 \times 2^3 + 0 \times 2^4 + 1 \times 2^5 = 44_{10}$. Converting from decimal to binary is a bit more complicated. One way to do it is by interated division. You divide the decimal number being converted by 2. The remainder (always a 1 or a 0) becomes the rightmost bit of the binary number. The quotient is then divided by two; this time the remainder is placed to the left of the previous remainder. Continue dividing until the quotient equals 0. For example, convert 451_{10} to base 2.

Binary numbers are fine for computers, but they do tend to get pretty long. For this reason, many programmers prefer to use hexadecimal, (known in the business as hex) base 16. Conversion from binary to hexadecimal is extremely simple, once you realize one thing. Remember that base two required two digits, 0 and 1, in which to represent all numbers. Decimal requires 10 digits (0, 1, 2, 3, 4, 5, 6, 7, 8, 9) to represent all numbers. Well, hex requires 16 digits to represent all numbers. Unfortunately, the inventors of our number system (being decimal-type people) just didn't think to provide us with 16 unique one-place digits. (Remember, we can't us the 2-digit number 15 to represent a fifteen in base 16, because 15_{16} means $5 \times 16^0 + 1 \times 16^1$.) So in hexadecimal, we use the following digits: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F. Obviously, $F_{16} = 15_{10} = 1111_2$. Notice that all 16 of the hexadecimal digits can be represented in four binary digits. So, to convert from binary to hex, just group every 4 bits (starting from the right) and write down its hexadecimal equivalent.

$44_{10} = 101100_2 = \underline{0010}\,\underline{1100}_2 = 2C_{16}$.

Converting back is just as simple. Convert each hex digit into 4 binary ones. There are other algorithms for all these conversions, some of them more suited for computer implementation. But, hopefully, you now understand the theory behind them. By the way, addition and subtraction are done in other number systems in the same way as they are done in base 10, except that you carry the two or the sixteen (by placing a one in the next column) instead of carrying the ten. So, to add $E_{16} + 3_{16}$, you add fourteen and three, equals seventeen. Seventeen is one sixteen (carry a one to the next place) and one = 11_{16}. The reason we have been doing all this number crunching is because assemblers list



the locations of instructions and data in hexadecimal and because some of the instruction in the 6502 instruction set can only be understood when the data they affect is viewed as a set of bits. Next time we will present an assembler listing and analyse what its parts mean. But now, let's start to examine the types of instructions we have.

The 6502 Instruction Set

The instructions in the 6502 instructions set can be divided into the following categories:

1. Instructions that act on data in a single register or memory location.
2. Instructions that set or reset condition codes, and interrupt enables.
3. Instructions that transfer data from a register to a memory location, or from memory to a register, or between registers.
4. Instructions that change the ordinarily sequential flow of a program.
5. Instructions that compare the contents of a memory location with the contents of a register.
6. Instructions that operate on the stack.

An instruction can be divided into two parts - an op code and an operand. In general, the op code says what to do and the operand says to whom to do it. However, there are many 6502 instructions which do not require an explicit operand because the operand is implied in the op code itself. The format of an op code is invariant, while the format of the operand will vary because of the many different ways the location of an operand can be specified. The format of the operand part of an instruction is known as its addressing mode. Some op codes can be used with operands in a number of different addressing modes, while others require that their operands be in certain specific formats. The addressing mode of instructions that lack operands is called implied addressing. This type of instruction always affects a register, condition code, the stack or an interrupt. It never affects a memory location. All instructions in the implied addressing mode are 1 byte long. They include: INX, INY (increment the X or Y register), DEX, DEY (decrement the X or Y register), CLC (clear the carry bit), and TAX and TAY (transfer the accumulator to the X or Y register).

Instructions in the immediate addressing mode are 2 bytes long. The first byte contains the op code. The second byte contains a decimal, binary, hexadecimal or octal (base 8) constant. The following op codes can be used with immediate addressing: ADC and SBC (add or subtract the constant in the next byte from the value in the accumulator, while taking into account the value of the carry), AND (logical–and the accumulator and the constant), CMP, CPX, CPY (compare the constant with, respectively, the accumulator, the X register or the Y register and set the condition codes according to the results you find), EOR (exclusive-or the constant and the accumulator, LDA, LDX, LDY (copy the constant into the accumulator, the X register or the Y register), and ORA (logical–or the accumulator and the constant). The results of all logical and arithmetic computations involving the accumulator are stored in the accumulator.

Don't worry if you have not memorized all these instructions. They are mentioned so you can begin to familiarize yourself with them. Next time we will examine some of them in more detail, and discuss some of the more complicated addressing modes and instructions available to you. ■

LTA: A Case History

Continued from Page 14

The computer does the rest. The days of manually filing and tabulating reports are over. The machine automatically files each piece of information in the proper place of the proper record. It also computes the amount of time spent on a client, as well as the amount each client should be billed, will print up the statement, and even prepare statistical reports. All this information is available at any time, with only a few keystrokes. Carol Fuoco does not miss the extra work she used to do. Philip Fuoco appreciates the power and efficiency the computer has brought to his law practice. ■

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What Dialect Does Your PET/CBM/VIC Speak

by Joseph Devlin

In any language, there are bound to be several different dialects--so it is with Commodore's "PETBASIC". Turn on the machine and the first message displayed on the screen will tell you which version of BASIC your machine uses. The first Commodore BASIC was released in 1977 for the PET 2001-8 computer. Since that time a number of new versions of Commodore BASIC have been released. Commodore has made an effort to produce new versions that will allow you to run old programs from earlier versions on the more recent versions. Thus while a program written in BASIC 3.0 should run on a 4.0 machine the converse is not necessarily so.

Each version of Commodore BASIC has been assigned a number to help identify it. The earlier versions were assigned two designations, an engineering designation, and a marketing designation. The marketing designation is the numbering system you are most likely to see. To be complete we will mention both.

COMMODORE BASIC

If this is what appears on your screen when you first turn on your computer then your machine is equipped with BASIC 2.0. BASIC 2.0 (engineering 1.0) first appeared in August of 1977, and was built into the early 4K and 8K PETs.

###COMMODORE BASIC###

This little phrase heralds the arrival of BASIC 3.0. (Depending on your machine the words can be either in upper or in lower case.) BASIC 3.0 (engineering 2.0) appeared in July 1978 and is now standard in all 2001 series PETs. This version added a machine language monitor and corrected know bugs of version 2.0.

****CBM BASIC V2****

VIC 20 computers support a version of BASIC 3.0. Significant changes have been made in this version of BASIC 3.0. As a result it is functionally a different version than the 3.0 BASIC found in PETs. A program written for the 3.0 PET should run on the VIC provided the programmer stays away from PEEKs and POKEs.

COMMODORE BASIC 4.0

Tells you that your machine supports BASIC 4.0. BASIC 4.0 (same marketing number) came out in October of 1979 and is the standard for all the CBM 4001 and CBM 8000 computers.

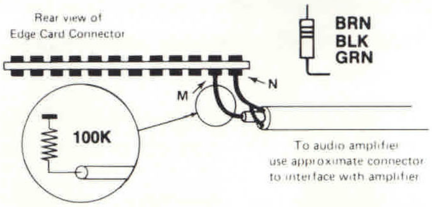
BASIC 4.0 is the first version of BASIC expressly written to be used with a disk drive. This does not mean you can't load a program from a cassette unit. Rather it means shortcuts have been built into the machine designed to ease the use of disk drives rather than cassette players. For example, if you own a BASIC 4.0 computer you can load the first program from disk drive 0 by simultaneously hitting the shift and run/stop key. The same two keystrokes on a BASIC 2.0 or 3.0 machine will try to load the first program from a cassette drive.

Versions 1.0, 2.0, and 3.0 support sequential and random files. BASIC 4.0 supports sequential, relative and random files. Any CBM or PET computer can be upgraded to 4.0 BASIC with the exception of the original 8K PETs. The advantage of having BASIC 4.0 over another version of BASIC is that the more recent the version the more features it provides. The 4.0 version enhances the speed of string processing, and integrates disk commands into the BASIC language.■

More on Sound for Your PET

by Dave Moyssiadis

Last issue an article appeared in the **COMMODORE INTERFACE** which explained how to connect an audio amplifier to the CB2 line on the user port. Ordinarily, there is no harm in making the connection directly as given in that article. However, it is possible that you may be using an amplifier which, either due to a malfunction or by an uncommon design, will present the CB2 with an overload condition. Since there is no overcurrent protection for the CB2, it would not be unwise to provide such protection yourself. This is simply done by inserting a 100K 1/10 or greater watt resistor in series with the signal line (i.e. pin M or center conductor of cable) as shown in Fig. 1. This will protect the CB2 even if there is a short at the other end of the patch cord or even in the cord itself.■



The Commodore Interface
is seeking features for
use in upcoming issues.
If you have developed
a program, game or
an application that
would be of interest
to our readers
please submit this to:

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Commodore Interface
681 Moore Rd.
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PROGRAMMER'S TIPS

Protecting the Input Statement

by Neil Harris

There is no statement more prone to unpredictability in PET and CBM BASIC than INPUT. The problem is that the computer turns over complete control of operation to the user, who is essentially a random factor. This means that any conceivable value will be entered through typing errors or direct effort, by the bored user given a long enough period of time. Thus, the first law of INPUT statements:

Anything that can be typed in will be typed in.

If the program is being written solely for one's own use, this factor is minimized. After all, there is no challenge in confusing a program when you already know its every nuance. Therefore, the time for error-trapping procedures is when writing a program for other people to use. In fact, the vast majority of programs are written for other people's use, or get that way somewhere along the line.

The most common cause of problems with using the INPUT statement is that hitting the RETURN key causes the user to drop out of the program. It is easy to return to the program using CONT, but a novice user will not know how to do this.

There are two methods for insuring that just hitting RETURN doesn't cause problems.

```
100 PRINT"     *▮▮▮";
110 INPUTA$
```

```
100 OPEN1,0
110 PRINT"?";
120 INPUT#1,A$
```

("▮▮▮"=3× CRSR ⇐)

In line 100, an asterisk is placed in the third space to the right, and the cursor is repositioned back at the start. The INPUT in line 110 prints a question mark and a space, and puts the cursor on top of the asterisk, so that the RETURN key only sets A$ to "*". The asterisk can be replaced by a shifted space, which has the advantage of being invisible. If the value to be INPUT is a number, you can replace the asterisk with a 0, or just take the VAL of the string after line 110.

The second method is to open the screen as an input file. The INPUT# statement flashes a cursor just like a normal INPUT statement, but doesn't put a question mark on the screen. So after OPENing the file, I PRINT the ? and go on with the INPUT#. Even striking RETURN won't cause a problem here.

Which of these methods should you use? This depends on the level of expertise the program is intended for. If the program is for yourself, or another programmer, you may want the first method, because it is possible to escape from the INPUT by just typing spaces and hitting RETURN. There is little chance that an unsophisticated user would accidentally hit upon this. However, if your program is intended for the general public, you should use a method at least as secure as the second method shown above. This leads to the second law of INPUT statements:

The Degree of Error Checking Needed is Inversely Proportional to the Level of Expertise of its Intended User.

There is actually one other factor to consider when getting information from the user, and that is security. When writing an accounting package, or a program which is protected against reading, it is necessary to take further steps to insure that there are no false inputs whatsoever. On the PET and CBM, this involves using the GET statement and analyzing each keystroke as it is made, a specialized routine for each program. This leads to the third law of INPUT statements:

If Security is a Concern, Don't use Input at all. ■

ATTENTION PROGRAMMERS

Commodore is compiling a list of software written for our computers. If you have software you would like to have included in this listing please submit the following for review:

- copy of program on disk or tape
- documentation describing purpose and utility of the program
- specify equipment necessary for program operation
- information on price of program and where the program can be purchased

Please submit this information to:

SOFTWARE Committee
Commodore Business Machines
681 Moore Rd.
King of Prussia, PA 19406

PROGRAMMER'S TIPS

The IEEE-488 Bus

by Jim Butterfield

Reprinted from **The Transactor**.

The IEEE-488 Bus is a parallel interface designed to exchange data with selected devices connected to the bus.

Many devices may be connected at the same time, but only the one that has been selected will send or receive data. For example, two printers and a disk unit could be connected to a bus; the Basic program would arrange to send to or receive from the various devices as desired.

Selection works by means of a "calling" system. Before sending data, the computer first sends a selection character, which commands the appropriate device to "listen". If the device is connected, it will acknowledge the command. Now the data is sent; each byte is acknowledged by the receiving device. Finally, the device is disconnected by an "unlisten" command. To receive data, the computer instructs the appropriate device to "talk". It then accepts data until the device signals "end of data", at which time the computer sends an "untalk" command.

Commands are distinguished from data by using a special line call ATN (attention). If the ATN signal is low (meaning true), the information being sent is a command: talk, untalk, listen, or unlisten. If the ATN signal is high (meaning false), the information being sent or received is data. In this system, only one direction is used: the computer sends ATN and the devices receive it. When ATN is low, all devices receive the commands, to see if they are being selected. When ATN is high, only the selected device will accept data.

Another line, called EOI (end or identify) is used to signal the last byte of data. It works in both directions: if the computer is sending, it signals EOI low (meaning true) with its last character; if the device is sending, it signals EOI low if is has no more data after the character it is sending.

When a device sends to the computer, it delivers each character only when invited by the computer. Similarly, the sending computer delivers characters only as fast as the device is ready for them. This flow is controlled by a "handshake" procedure.

An example of selection: When Basic executes OPEN 3, 4, the IEEE-488 bus sets the ATN signal low and transmits hexadecimal 24 to the data lines, instructing device #4 to listen. If the device does not answer, Basic will return either DEVICE NOT PRESENT (ST-128 decimal) or WRITE TIME–OUT (ST-1). Subsequently, when the command PRINT#3, "HELLO" is given, the ATN signal is again set low and has 24 transmitted to instruct #4 to listen; then ATN is set high, and the characters H, E, L, L and O are sent, with EOI set low during the transmission of the O character; finally the ATN is set low and hex 3F is sent to cause the device to unlisten. Note that we haven't closed the file yet; but we have (temporarily) disconnected the device.

Using CMD on the IEEE-488 Bus

CMD does two things:

- it opens the appropriate device to "listen",
- it will divert output, normally directed to the screen to the IEEE-488 bus.

Both CMD activities are cancelled in any of three ways:

- preferred: when the bus is addressed with a normal PRINT# command;
- when any INPUT or GET is performed;
- when a Basic error is encountered.

It is best to avoid CMD within Basic programs, since any use of INPUT or GET will cancel it, and the programmer will have to arrange to repeat the CMD as necessary. Use PRINT# wherever possible. CMD is most useful in obtaining program listings. The preferred method:

- OPEN 4, 4 (identify the printer as device #4)
- CMD 4 (open the printer to listen & redirect output)
- LIST (do the listing)
- PRINT#4 (cancel the CMD functions)
- CLOSE 4 (close the file)

Never close a file until you have first cancelled the CMD command.

IEEE-488 Handshake: a brief technical description

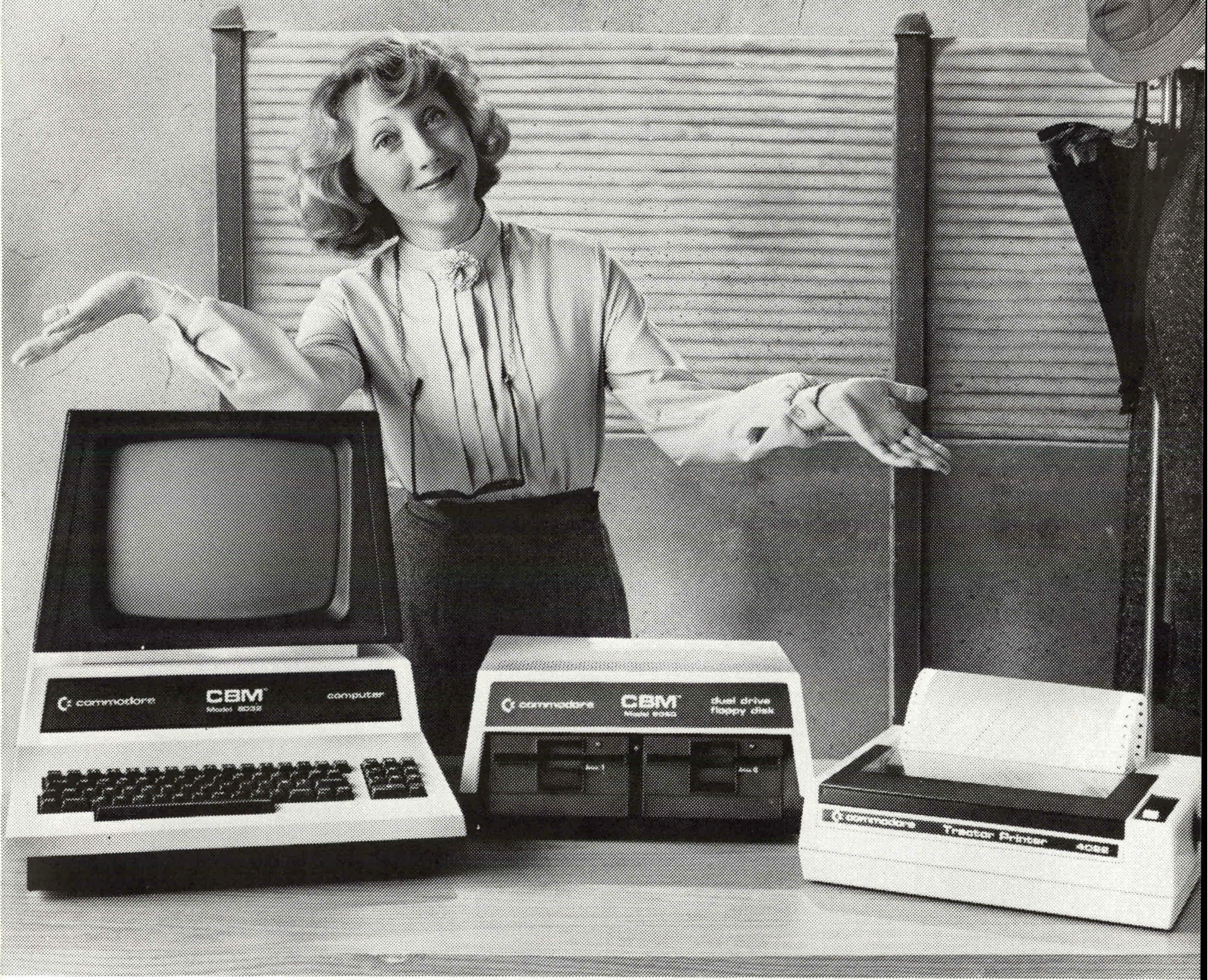
The same handshake procedure is used for both command and data transmission.

The talker uses the DAV (Data available) line to indicate that valid data has been placed on the bus. The listener uses two lines: NRFD (Not ready for data) to indicate that it is not yet willing to receive data; and NDAC (Data not accepted) to indicate that is has not yet taken from the bus.

Transfer of data takes place in the following manner:

1. The talker initially places DAV high (meaning false) to indicate that data is not being sent yet. The listener will have NDAC low (meaning true) to indicate that no data is being received. If the listener is still working on something (say, printing the previous character) and can't accept data yet, it will set NRFD to low (true), meaning it's not ready.
2. The talker checks the NRFD and NDAC lines for both high (meaning false). If they are both high, something is wrong. If the computer is the talker, it will send DEVICE NOT PRESENT.
3. The talker places its data on the bus, but doesn't signal DAV low for data available until is sees the listener's NRFD is high, which signals that the listener is ready to receive data. The talker will wait forever - there is no timeout.
4. The data is ready, so the listener accepts and stores it. Then the listener sets NRFD low (true) and NDAC high (false) to acknowledge its receipt. The listener has a time limit on this activity: if it doesn't complete in 64 milliseconds, the talker will flag TIMEOUT ON WRITE.
5. The talker responds to the acknowledgement by setting DAV high, meaning that the data is no longer offered, and then clearing the data bus.
6. The listener detects the change in DAV, and realizes that its acknowledgement has been seen. It returns NDAC to low, completing the character exchange cycle. There is a time limit here: if the listener doesn't see DAV go high within 64 milliseconds, it will flag TIMEOUT ON READ. ■

COMMODORE CBM. THE LAST WORD IN WORD PROCESSING SYSTEMS.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The CBM word processing system lacks absolutely nothing. In fact, it offers features some of the big expensive systems can't.

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GAMES & RECREATION

Monster Shootout

by Duane Later

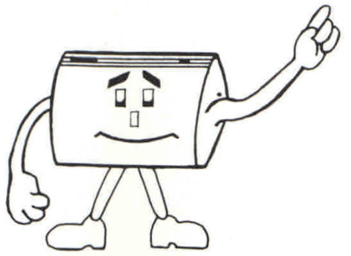
Often when programmers want to move large objects quickly across the PET screen, they must use machine language routines to obtain the necessary speed. However, if the objects are moving from the right side of the PET screen to the left side, it is often sufficient to use PET's character delete function to move objects and thus spare the programmer the time required to develop and incorporate machine language routines into his program. The programming technique is quite simple: The BASIC program must position the cursor, using programmed cursor controls, at the second print position on the PET screen, and consequently print CHR$ (20), which is the delete character. All characters on that line will scroll right to left. By repeating this on several different lines, large objects will move right to left on the screen.

I've written a simple game to demonstrate this technique. This program moves a series of figures, either human, a block, or fried eggs (??) right to left on the screen. Hitting any key causes a shot to be fired upward towards the moving figures. Hitting the human results in a loss of 400 points, hitting a block adds 50 points to the score, and hitting the eggs adds 100 points. As written this game will run on any 40 column PET/CBM with any version of BASIC.

Let's examine the program in detail. Line 6 sets variable D$ as a cursor-right character and as a delete character. Printing D$ anywhere on the screen results in the right to left scrolling of the line. Lines 19 to 30 set the subscripted variable A$ as the figures of a human, a block and eggs. Line 40 randomly prints either the human, block or eggs at the right side of the PET screen. Line 70 positions the cursor at the proper place to perform the deletes, and line 75 performs the deletes on three consecutive lines, causing the figures appearing on the screen to scroll right to left. The rest of the lines perform the other tasks necessary for the game to work.

There are probably quite a few other useful programs that can use this unique delete function. Experiment! ■

```
 0 REM SHOOT-GALLERY BY DUANE LATER
 1 REM  "▣" CRSR DOWN - "⊐" CRSR UP
 2 REM  "▮" CRSR RIGHT- "▌" CRSR LEFT
 3 REM  "▩" IS RVS - "■" IS OFF RVS
 4 REM USES DELETE FUNCTION - CHR$(20)
 5 REM TO SCROLL HORIZONTALLY
 6 D$="▮"+CHR$(20)   :REM SET D$ AS SPECIAL DELETE STRING
 7 PRINT"⊐" :REM CLEAR SCREEN
 8 PRINT"S▣▣▣▣▣▣▣▣▣▣▣▣▣▣▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮HUMAN  -400 POINTS
 9 PRINT:PRINT"▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮BLOCK    50 POINTS
 10 PRINT:PRINT"▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮FRIED EGGS  100 POINTS
 11 PRINT:PRINT"▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮MISS    -50  POINTS
 17 PRINT"S▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮** HIT ANY KEY **";
 18 POKE 33655,160     :REM SET WHITE BLOCK
 19 A$(1)="╱ ╲▌▌□▩ ▀□▌╲●╱▌▌▌▣▣"    :REM STRING FOR MAN FIGURE
 20 A$(2)=" ╰──╯▌▌▌▌□|oo |▌▌▌▌□╭──╮▌▌▌▌▣▣▣⊐"   :REM FRIED EGGS
 30 A$(3)="L▌▌□▔▌▌▣"   :REM BLOCK
 40 IF A=7THENA=0:J=INT(RND(1)*3+1):PRINT"S▣▣▣▣▣▣▣▣▣▌▌▌▌▌▌"A$(J)
 50 IFE=1THEN3000
 70 PRINT"S▣▣▣▣"   :REM SETUP FOR DELETES
 75 PRINT D$:PRINTD$:PRINTD$: REM DO THREE DELETES
 90 A=A+1
 100 GET A$      :REM FIRE A SHOT ?
 110 IFA$>""ANDE=0THENE=1:F=33615
 120 IFE=0THEN40 :REM IF SHOT NOT IN MOTION THEN 40
 130 POKE F,32: F=F-40
 135 IFPEEK(F)<>32ORPEEK(F+1)<>32THEN200
 140 IF F<32888THENE=0:SC=SC-50:GOTO260
 160 POKEF,81     :REM SET ROUND BALL
 170 GOTO 40      :REM REPEAT
 200 FORR=0TO5:FORT=0TO120STEP40:
 230 IFPEEK(32974+T+R)=160THENSC=SC-400:GOTO239 :REM HIT HUMAN - SUBTRACT 400
 235 IFPEEK(32974+T+R)=87THENSC=SC+100:GOTO239 :REM HIT EGGS - ADD 100
 237 NEXT:NEXT
 238 SC=SC+50 :REM HIT BLOCK-ADD 50
 239 IFA<4THENPRINT"S▮▮▮▮▣▣▣▣▣";:GOTO250
 240 PRINT"S▮▮▮▮▮▮▣▣▣▣▣";:FORI=1TO7-A:PRINT"▮";:NEXT
 250 PRINT"         ▌▌▌▌▌▌▌▣ BANG ▌▌▌▌▌▌▌▣         "
 260 PRINT"S▣SCORE =         ▌▌▌▌▌▌"SC
 300 E=0
 1000 GOTO40
 2000 REM 3000-3030 IS SPECIAL ROUTINE
 2005 REM TO MOVE BALL THROUGH OBJECTS
 3000 POKEF,32:PRINT"S▣▣▣▣"
 3010 PRINT D$
 3020 PRINT D$
 3030 PRINT D$:POKEF,81:GOTO90
READY.
```



VIC-20 Update

by Michael Tomczyk

Now that the VIC is becoming available at selected computer dealerships, everyone is clamoring for information on the product. . .how to use it, what programs are available, new accessories, etc. Here's a quick rundown on Commodore's "friendliest" personal computer. . .

USER FRIENDLY USER MANUAL. . The VIC Product Development Team, assisted by Avalanche Inc., has developed a "user friendly" owner's guide called 'Personal Computing On the VIC 20". The guide provides a "friendly" introduction for first-time computerists, with sample programs provided at the beginning of each character to "make something happen" almost immediately. . .also, you DON'T have to read the entire book to get to a topic you're interested in. The VIC Personal Computer Guide lets you start at any chapter. . . for example, if you're interested in computer animation, go directly to Chapter 4. More detailed programming information and helpful appendices such as simple sound effects and games to try are included in the Appendix.

PROGRAMMING GUIDE. . .Although "user friendliness" is often associated with first time computerists, we haven't neglected computer programmers (they're friendly, too!) Our VIC 20 PROGRAMMERS REFERENCE GUIDE is a "user friendly" programming guide including detailed information on BASIC programming, 6502 Machine Code programming, VIC Programming Tips, I/O Interface Techniques, and a comprehensive Appendix. Availability is planned for May-June.

VIC PROGRAM TAPES. . .In addition to programming the VIC yourself, you can also buy program tapes from your Commodore dealer. These tapes work with the Commodore Tape Cassette Recorder and the VIC, and will come in the following 5 categories: Games and Recreation, Education, Home Management, Business & Calculation, and Computing Aids. The first 6 tapes will include the following titles:

- VIC 21 Casino Style Blackjack (Recreation)
- SPACEMATH (Education-Math Improvement, grades 1-4)
- BLUE MEANIES FROM OUTER SPACE (Game)
- BIORHYTHM COMPATIBILITY (Recreation)
- CAR CHASE (Game)
- SLITHER/SUPER SLITHER (Game)

The second 6 tapes (tapes are produced in groups of 6) will include 6 educational tapes focusing on math improvement drills for grades 1-6. Subsequent programs will include a music writing program, mortgage/loan calculator, personal budget and more.

VIC PROGRAM CARTRIDGES. . . Direct plug-in cartridges are also in the final stages of development and will be available early this summer. Several arcade-style games will be introduced on cartridge, including two space games (VIC Invaders and VIC Avengers), an excellent road rally game and a rocket maze game. We will also be introducing a Programmers Aid Cartridge with several excellent programming features, and a special video graphics package which lets you plot lines, circles, boxes, etc. on the screen and includes several sound-related features as well.

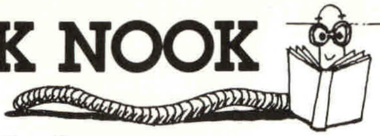
PET/VIC COMPATIBILITY. . . PET users should note that the VIC uses the same tape cassette recorder as other Commodore computers, so PET owners who want to acquire a VIC will be able to use their Commodore tape cassette. Other PET peripherals, such as disk drives, will not be immediately compatible with the VIC, however, because the VIC has a serial bus interface and the PET/CBM has an IEEE-488 inter-face. In the coming months an IEEE interface cartridge will be available which will allow the use of PET/CBM peripherals with the VIC . . .to expand VIC to IEEE applications.

VIC MODEM AND THE SOURCE. . . We are currently working to develop a low priced ($99-120) telephone modem which will enable VIC owners to access telecomputing networks such as THE SOURCE. Introduction is scheduled for late summer. In the meantime, a Commodore file is being set up on THE SOURCE and will include a menu item "VIC" which will in turn access a variety of special data files including programming tips, technical specifications, etc. For the present, SOURCE users can type BASIC TCE812 (10))READ to access a VIC "bulletin board" compiled by Neil Harris, one of our VIC team members. PET/CBM owners are also starting to correspond with our VIC team through THE SOURCE and we're delighted to find so much interest and enthusiasm for our product. VIC owners will find THE SOURCE to be one of the most interesting and intriguing services available. More about VIC and THE SOURCE in the next issue of **COMMODORE INTERFACE.**

VIC SINGLE DISK DRIVE. . . a single disk drive unit is also under development by Commodore. . .both PET/CBM and VIC versions are planned. These drives will accept 5 1/4 inch floppy disks with a storage capacity of up to 170 kilobytes (about 170,000 characters). Commodore's single disk drive will allow computer owners to build their system in smaller steps. . . acquiring one disk drive at a time and expanding later (most disk users eventually acquire two or more drives).

VIC OVERSEAS. . . Many Americans aren't aware that Commodore is an international computing company and the dominant manufacturer of personal computers in Europe and Canada. The VIC is being sold in Europe and Asia as well as in the United States. In Europe the VIC is called the VIC 20 or VC 20. In Japan, where some of the best VIC cartridge programs are being written, the VIC is known as the VIC 1001. So if you hear about a "VIC" personal computer overseas and it has a slightly different name, it's the same computer with slightly different technical specifications to meet that country's power or video display requirements, being sold by another Commodore company. ■

BOOK NOOK

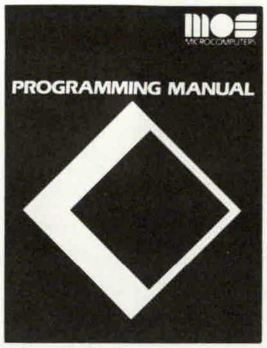


by Joseph Devlin

MOS
MICROCOMPUTERS
HARDWARE MANUAL

MOS Hardware Manual

Author/Publisher: MOS Technology
Price: $6.95



MOS Programming Manual

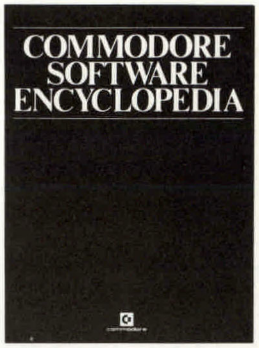
Author/Publisher: MOS Technology
Price: $6.95

At the heart of every Commodore computer is a marvel known as the 6502 micoprocessor. It is this little beastie that gives intelligence to your computer. If you plan to try your hand at machine or assembly language programming or if you wish to experiment with interfacing your machine to other peripherals then you will probably want to get to know this fellow better. These two companion books were written to help you understand the workings of the 6502 microprocessor, its close relatives the 6503, 6520, and the rest of the 6500 series of microprocessors. These books aim to give you all the information you will need to program and interface one of the microprocessors in the 6500 family. First printed in 1976 and now reprinted under new covers they are just as relevent today as when they were first printed.

The **MOS Hardware Manual** covers the components available in the system, how these components can be interconnected, and their basic architecture. The book assumes the reader has had a minimum of experience in dealing with these components. All technical terms are clearly defined, diagrams and examples are provided to help clarify the points being made in the text. Detailed descriptions of the workings and architecture of the 6502 are given. The individual already familiar with the hardware, machine programming, and the 6502 instruction set will find these diagrams useful for reference and for quickly refreshing the memory. Chapter 1 introduces the reader to the 6500 microprocessor family, It introduces the terminology and discusses the components of the 6500 product family. Chapter 2 is application-oriented, with a discussion of system configuration, the I/O processing, handshaking, memory addressing techniques etc. Chapter 3 is devoted to starting-up, testing and diagnosing a system.

The **MOS Programming Manual** describes in detail the machine language instruction set of the microprocessor family, it's relation to the hardware itself, and how to go about using the instruction set. The reader who is looking for a basic introduction to the 6502 microprocessor family will want to read the whole book. Each facet of programming the processor is fully detailed in clear simple language. Each instruction is described, all the quirks of each instruction and the effects these quirks will have in your programming are described. In addition, all the information discussed in detail in the manual is summarized in a series of tables. These tables include listings of each instruction along with its mnemonic, addressing mode, execution cycle, memory requirements, addressing requirements, hex sequence, etc.

Although both books are clearly written and well illustrated, both assume some previous programming experience and an understanding of some of the fundamentals of microprocessor architecture. These books can be purchased through your Commodore dealer. ■



Commodore Software Encyclopedia, First Edition

Author/Publisher: Commodore
Price: $4.95

Have you been looking for a software package that will help you redecorate your home, one that will balance your checkbook, or manage you stock portfolio but were not sure where to find them? The **Commodore Software Encyclopedia** will lead you right to the program you are looking for.

Ever since the day that the first PET computer rolled off the production line, computer programmers and software houses have been busy producing thousands of programs for Commodore computers. Hundreds of these programs have been made commercially available.

The **Commodore Software Encyclopedia** is a comprehensive reference guide that will let you know what software is available for your Commodore computer. This 150 page volume lists almost 500 programs that can be run on your Commodore. The main body of the work is devoted to a listing of the programs broken down into seven catagories: business, word processing, utilities, education, games, personal aids, and engineering aids. Each listing includes the package's name, product code (to be used when ordering), a brief description of the software package, the vendor of the package, and the price. All products produced by Commodore or approved by Commodore are appropriately labeled.

Also included in the encyclopedia are an overview of the current Commodore hardware, an alphabetic listing of all the software vendors whose packages are found in the book, and a program index.

The **Commodore Software Encyclopedia** can be purchased through your local authorized Commodore dealer. ■

COMPUTERS, PERIPHERALS AND CABLES

Computers

VIC 20	First full-featured, expandable color computer system. Full PET keystroke graphics with 5k RAM, expandable externally to 32k RAM.	
PET 4001 PROFESSIONAL COMPUTER 4016 4032	PET with large terminal styled keyboard with separate numeric pad and graphic keys and a 40 column by 25 line display (BASIC 4.0 OS).	16N 32N
CBM 8000 BUSINESS COMPUTER	Features a typewriter styled keyboard with separate numeric pad, and 80 column by 25 line display and new screen editor functions, and BASIC 4.0 Operating System.	8032

Peripherals

CBM 4040 DUAL DRIVE FLOPPY DISK	Dual drive intelligent 5¼" mini-floppy disk system with 343K byte net user storage capacity (DOS 2.1)
CBM 8050 DUAL DRIVE FLOPPY DISK	Dual drive intelligent 5¼" mini-floppy disk system with over 950K byte net user storage capacity (DOS 2.1)
CBM 4022 DOT MATRIX TRACTOR PRINTER	80 column dot matrix printer with forms handling tractor feed. Has full PET graphics, variable line spacing, programmable character and character enhancement.
CBM MODEM	High performance 300 BAUD IEEE interfaced modem features accurate teleprocessing communication for your CBM system.
CBM VOICE SYNTHESIZER	Features phoneme systhesis for vocabulary construction (rather than memory limited digital techniques). User port interface permits easy installation to any CBM/PET system.
CBM C2N CASSETTE DRIVE	Cassette input/output unit to use with PET/CBM computers.

Cables

IEEE to IEEE CABLE	Use this cable when connecting more than one peripheral (Floppy and Printer) to any PET/CBM Computer (P/N 905080).
PET to IEEE CABLE	Use this cable to connect your Floppy or Printer to any PET/CBM Computer (P/N 320101).

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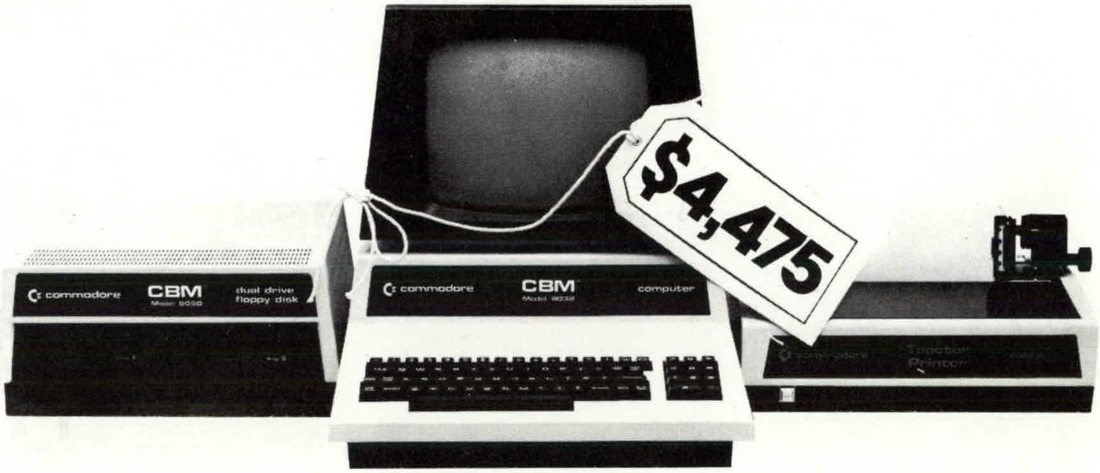
See what happened when we put a Commodore business computer in the same room with an Apple.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*Commodore 8032 business processor; 8050 dual disk drive (1 mb disk storage); 2022 tractor printer. The Apple system was configured to approximate the capabilities of the Commodore business system described above, using Apple's most recent published price list.

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